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(54) Name of the invention:

Protective Sheet Used in Catalyst Support Material of Automobile Exhaust Gas Purification Device

(71) Patent Assignee: **Nippon Asbestos Company**

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Detailed Description

1. Name of the Invention

Protective Sheet Used in Catalyst Support Material of Automobile Exhaust Gas Purification Device

2. Scope of the novel claims used in practice

- (1) Protective sheet used in catalyst support material of automobile exhaust gas purification device characterized by the fact that on both sides of a sheet type core material made at the predetermined thickness and by using vermiculite as its main material, sheet type cover material selected from the group of glass cloth, ceramic fiber cloth, glass paper, ceramic fiber paper, aluminum foil is stacked and combined, and both materials are bonded and unified as one body.
- (2) Protective sheet used in catalyst support material of automobile exhaust gas purification device according to the above described Claim paragraph 1 of the present invention, characterized by the fact that the above described sheet shaped core material and sheet shaped cover material, are bonded by a thread through a machine.
- (3) Protective sheet used in catalyst support material of automobile exhaust gas purification device according to the above described Claim paragraph 1 of the present invention, characterized by the fact that the above described sheet shaped core material and sheet shaped cover material, are bonded by an adhesive agent.

3. Detailed Explanation of the Invention

This invention is an invention about a protective sheet used in catalyst support material of automobile exhaust gas purification device, and especially, this is an invention about the improvement of the protective sheet which uses vermiculite as its main material.

In the past, as automobile exhaust gas purification devices the purification devices have been widely used where the catalyst used for the purification has been supported in a honeycomb structure material manufactured from ceramics, and this honeycomb structure material has been housed in a box shaped contained made from metal.

The above described ceramic material that can be used to support the catalyst is a material that has excellent thermal resistance properties, which are sufficient at the high temperatures that are generated during the action of the catalyst, and because of that it is a material that is optimum as a catalyst supporting material. However, on the other hand, there has been the difficulty point that this ceramic material is very brittle and it is easily deteriorated by thermal impacts and mechanical impacts.

Because of that, in the case of the above described purification device, in the space between the manufactured from ceramic honeycomb structure body and the manufactured from metal box shaped container, housing it, a material is filled that is capable of absorbing mechanical and thermal impacts.

As the above described filler material, inorganic materials are appropriate, and among them, especially, the sheet material containing vermiculite as its main component, is most appropriate as a filler material for the above described purification device because it has excellent thermal resistance properties, and not only that, but also, because of the fact that it tightly fills in the space between the metal box shaped container, which expands when heated, and the honeycomb structure material, and demonstrates excellent cushioning properties relative to vibrations and impacts.

However, in the case of the above described sheet that is formed from vermiculite, a material is used that is obtained as inorganic fiber material and organic bonding agent are added to the vermiculite together with water, and this is then stirred and mixed, and the obtained mixed material is subjected to a spread out preparation treatment and by that it is formed into a sheet shaped material.

However, in the case of the vermiculite sheet material that is obtained according to this process, there is a problem point with respect to the mechanical strength, and especially, the tensile strength is poor, and because of that in the manufacturing operation where this is wrapped onto the honeycomb structure material, there is a generation of numerous breaks and cuts, and the break damage proportion is high and this has been the main deficiency.

The present invention is an invention that has been conceived in order to solve the above described problems, and it is an invention that has as its main goal to suggest a protective sheet used in catalyst support materials where it is possible to design a significant increase of the tensile strength of the sheet without compromising the properties of the vermiculite sheet material, and not only that, but also, it is possible to design an increase in the thermal resistance properties and thermal insulation properties of the sheet.

The protective sheet used in catalyst support material according to the present invention is characterized by the fact that it has a structure where on both sides of a sheet type core material made at the predetermined thickness and by using vermiculite as its main material, sheet type cover material selected from the group of glass cloth, ceramic fiber cloth, glass paper, ceramic fiber paper, aluminum foil is stacked and combined, and both materials are bonded and unified as one body.

Here below, this invention will be explained in further details based on diagrams that show its different practical implementation examples.

According to Figure 1 through Figure 5, (1) represents the sheet shaped core material that is formed by using vermiculite as its main component, and (2) represents the sheet shaped cover material that is placed and bonded on its both sides.

Regarding the sheet shaped core material (1) that has vermiculite as its main component, it is a good option if it is obtained as inorganic fiber material and organic bonding agent are added to the vermiculite together with water, and this is then stirred and mixed, and the obtained mixed material is subjected to a spread out preparation treatment and by that it is formed into a sheet shaped material. As the vermiculite that is used as the main component, it is a good option if untreated raw material particles are used, however, depending on the requirements, it is also possible to use particles that have been coated and pretreated so that they can easily spread at low temperatures and materials where covered treated particles have been admixed.

As the sheet shaped cover material (2) that has been shown according to the presented in Figure 1 and Figure 2, it is possible to use nonwoven fabric material like glass cloth, ceramic fiber cloth etc., and this is then bonded and unified as one body with the above described sheet shaped core material (1) by a thread (3) using a machine.

In the case of the sheet shaped cover material (2) that is shown in Figure 3, its structure is formed as an inorganic paper (2a), such as glass paper or ceramic fiber paper and the surface of the core material (1) are brought together, and by using a machine they are bonded and unified as one body by using a thread.

In the case of the sheet shaped cover material (2) that is shown in Figure 4, a material is selected from the group of glass cloth, ceramic fiber cloth, glass fiber, ceramic fiber paper, aluminum foil, and by using the adhesive agent (4), this is bonded to the core material (1) and unified as one body.

The material shown according to Figure 5 is a material where on one side of a core material (1), which has been made into a fine length sheet shape, the ceramic fiber paper (2a) is adhered, and the surface of the opposite side and both side surfaces are wrapped by using a cover material (2) made from glass cloth, and these edge parts are adhered on the top of the paper (2a).

Regarding the means for bonding of the sheet shaped cover material (2) to the vermiculite sheet shaped core material (1), in the case when

the cover material (2) is a material such as a nonwoven fabric, it is advantageous if it is bonded by using a machine and employing the thread (3), however, in the case when thin materials such as paper or aluminum foil, are used, it is appropriate if it is bonded by using an adhesive agent.

According to the above described, the material obtained is a protective sheet material where on both surfaces of a vermiculite sheet shaped core material (1), the sheet shaped cover material (2) has been bonded as one unified body, and it is a material where there is no hindrance to the expansion properties possessed by the sheet shaped core material, and an increase of the mechanical strength has been designed. Especially, in the case of the above described structure, a sufficient tensile strength is obtained, and because of that it is possible to practically eliminate the danger of breaks – cuts which occur at the time of the wrapping onto the honeycomb structure material, which is the catalyst supporting material, and at the time of the placement into the metal box shaped container.

Also, in the case of the above described structure, it is possible to also eliminate the stress relaxation of the vermiculite sheet shaped core material (1) at high temperatures ($700^{\circ}\text{C} \sim 1000^{\circ}\text{C}$), and together with that by the presence of the sheet shaped cover material (2) that is formed from inorganic material, the thermal insulation properties and the thermal resistance properties of the protective sheet are further increased, and because of that there is a pronounced effect of preventing the deterioration of the vermiculite material.

Then, also, in the case of the above described structure, the vermiculite sheet shaped core material (1) is squeezed from both sides by the bonded to it sheet shaped cover material (2), and because of that, an excellent effect is demonstrated in suppressing the phenomenon of generation of vermiculite powder “sagging” due to the effect of vibrations and impacts for a long duration at the time when the automobile is running.

According to the above described, in the case of the present invention, it is possible that in the state where the expansion properties of the vermiculite are maintained in the state as they are, the mechanical strength is significantly increased, and because of that it is possible to

design a an improvement of the handling properties of the vermiculite sheet, and together with that it is possible to eliminate the breaks – cuts which occur at the time of the wrapping onto the honeycomb structure material, which is the catalyst supporting material, and at the time of the placement into the metal box shaped container; and not only that, but also, there is an excellent effect in suppressing the phenomenon of generation of vermiculite powder “sagging” due to the effect of vibrations and impacts and a large improvement in the durability properties of the automobile exhaust gas purification device, is imparted.

4. Brief Explanation of the Figures

Figure 1 shows one practical implementation example according to the present invention and it represents a three-dimensional diagram where one part of the protective sheet used for the catalyst support in the automobile exhaust gas purification device, has been cut out. Figure 2 represents a partial enlarged cross sectional view diagram, Figure 3 shows another practical example according to the present invention and it is a cross sectional view diagram of the protective sheet part. Figure 4 shows another practical example according to the present invention and it is a cross sectional view diagram of the protective sheet part. Figure 5 shows another practical example according to the present invention and it is a cross sectional view diagram of the protective sheet part. Figure 6 shows another practical example according to the present invention and it is a cross sectional view diagram of the protective sheet part.

- (1).....vermiculite sheet shaped core material
- (2)sheet shaped cover material
- (3) thread
- (4) adhesive agent

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④ 仮締切用の物体

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明細書

1. 発明の名称

仮締切用の物体

2. 特許請求の範囲

(1) 仮締切用として可撓性膜製袋体を用いるものであつて、上記袋体には繫留のための可撓性膜及び止水のための可撓性膜を別々に又は兼用して袋体の長さ方向に沿つて取り付けてあり且つ袋体は内部に流体を注入して円柱状に膨張させることが出来るようにしたことを特徴とする仮締切用の物体

3. 発明の詳細な説明

本発明は仮締切用の物体に関するものである。一般に河川等の水の仮締切には土嚢が用いられているが、土嚢の作成及び積み重ねには多くの時間、労力を要する。即ち 60cm × 40cm 位の袋に一つづつ人力によつて土を詰めなければならぬし又 30kg/個位の袋を一つづつ殆んど人力で積まねばならない。

本発明は上記問題点を解消すべく考究されたも

のであり、可撓性膜製例えばゴム引布製の袋体に液体又は気体を注入して円柱状に膨張させ土嚢の代わりにしようとするものである。以下例示図面に就いて本発明を詳細に説明する。

第1図は本発明の仮締切用の物体の斜視図であり、(1)は円柱を形成する可撓性膜製例えばゴム引布製の袋体、(2)、(3)は注入、排出口、(4)は液体又は気体注入用ポンプ、(5)は注入パイプ、(6)は繫留のための可撓性膜製例えばゴム引布シート、(7)は止水のための可撓性膜製例えばゴム引布シート、(8)は膜固定用孔である。注入口を(2)、(3)と 2 つ設けた理由は袋体の長手方向何れの側よりも後述の圧力媒体の注入、排出が出来るようにするためである。

上記に於いて可撓性膜(6)及び(7)は袋体(1)に一体に取り付けられており、前者は袋体(1)の繫留のため、後者は袋体(1)下側の止水のためのものである。ただし、繫留、止水を兼ねた1枚の膜のものでも良い(第3図参照)。

又袋体(1)はポンプ(4)により液体又は気体等流体即ち圧力媒体を注入して膨張させることが出来る。

なお上記仮締切用の可撓性膜製袋体の寸法の1例を示せば下記の通りである。袋体(1)の直径D 0.7 m、袋体(1)の長さL 1.2 m、膜(6)の幅W 0.5 m、膜(7)の幅X 0.5 m

第2図は本発明の仮締切用物体の使用状態の説明図であつて、流れ方向で切断したものである。図中(10)は止水、(11)は床部を示し、その他第1図と同一符号は同一部位を示している。繫留用膜(6)は例えば膜固定用孔(8)に杭等を打ち込んで、又はその孔にロープを通しそのロープを固定されたもの例えば杭(12)に結びつけて袋体を繫留する。又止水用膜(7)は床部(11)に埋め込めば漏水を防げる。なお第3図に示す様に繫留用膜自体は止水用を兼ねこの膜を上流側河床に埋め込むか(図(a)参照)又はこの膜上に土嚢(9)を乗せてもよい(図(b)参照)。(6')はこの繫留、止水兼用膜である。

以上の様な本発明によると下記の様な効果がある。

(1) 締切りのためには袋体を河床に展張し、ポンプ等で袋体内部に液体又は気体を注入すればよ

い。これは人力に負うところが少なく、土嚢作成と比較して時間も短縮出来る。即ち締切りのための時間、労力が短縮、軽減される。

(2) 可撓性膜を使用しているため使用後袋体内部の液体又は気体を排出して折りたたみ容易に輸送、別の場所で使用出来る。即ち繰返し使用が可能である。

4. 図面の簡単な説明

第1図は本発明の仮締切用の物体の説明用斜視図、第2図は第1図の仮締切用の物体の使用状態の説明図で流れ方向で切断したもの、第3図(a)、(b)は夫々本発明の他の構造のものの使用状態の説明図で流れ方向で切断したものを夫々例示している。

- (1)…可撓性膜製袋体、(2),(3)…注入、排出口、
- (4)…流体注入用ポンプ、(5)…注入パイプ、
- (6)…繫留用可撓性膜、
- (6')…繫留、止水兼用可撓性膜、
- (7)…止水用可撓性膜、(8)…膜固定用孔、
- (9)…土嚢、(10)…止水、(11)…床部、

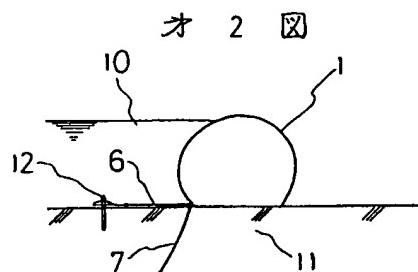
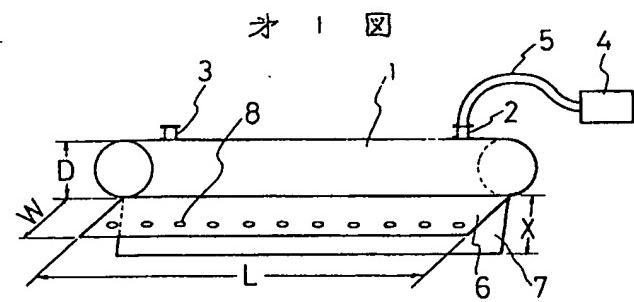
(3)

(12)…杭

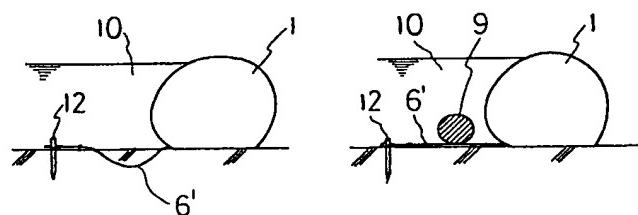
代理人 弁理士 吉竹昌司

(4)

(5)



(a) (b)



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